Response to Hawksworth & Sutton’s Proposals for Art. 59
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While changing and patching and polishing the Nomenclatural Code, botanists have established two of its principles as axiomatic beyond the others, namely: I. For a taxon with a particular circumscription, position and rank, only one name is correct, and II. that name is applied in accordance with its type. Other principles, articles and notes may change, but only within the unchanging framework set by these axioms, whereas any alteration or qualification of either axiom weakens the basis of the Code.

We do grant that there is in fact a slight relaxation of Axiom I for the sake of nine families which are allowed a specified set of alternate names. We also grant that the provision for conserving types of *nomina generica conservanda* may modify what we have called Axiom II. But these are openly endorsed escapes which do not undermine the Code.

As far as we have been able to discover, the one-taxon one-name principle is intact except for the families listed in Art. 18, note 3. Indeed, where the Code refers to imagined infractions of Axiom I, they do not really exist. For example, Art. 11 presumes that Art. 59 allows a taxon with a particular circumscription, etc. to bear two correct names – but Art. 59 does not really make such an allowance. Art. 34 refers to Art. 59 as somehow permitting an author to propose alternative names for the same taxon at the same time; but this accusation, too, is not justified. As we shall demonstrate below, Art. 59 does not provide an exception to Axiom I.

However, there is injury to Axiom II in Art. 59 – particularly insidious because it is not openly declared as challenging this axiom. Our purpose here is to draw attention to this hidden attack on so basic a postulate, and to intercept the further wearing away of the foundations of the Code that have been proposed by Hawksworth & Sutton (1974).

**The present and threatened future of art. 59**

All of Art. 59 except its last paragraph is for the use of mycologists dealing with Ascomycetes and Basidiomycetes which are pleomorphic in propagative devices, producing mitotic in addition to meiosporogenous organs. A fungus in these groups may be discovered on one occasion displaying one kind of reproductive organ, on another occasion another kind. And great difficulty may attend the attempt to prove the connection between the different states of one fungus. Mycologists have therefore

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agreed to allow these states to be treated as individual taxa bearing individual binomials, but with the understanding that any one taxon of a particular circumscription may bear only one name that is correct.

A circumscription comparable to that of any other botanical taxon is, in these fungi, covered by the name that is typified by a specimen bearing the meiosporogenous organs by which the fungus is recognized as a *Fungus Perfectus*. Art. 59 rules that only a name with such a type may be used in what Hennebert (1971) has called the botanical sense, to cover a fungus in all facets of its life cycle.

Imperfect states of perfect fungi may also bear binomials, but these cover taxa which are not allowed a botanical circumscription. A name typified by mitotic propagative organs applies to a taxon limited in circumscription to a portion of a fungus. In effect, it is a form-taxon for an anatomical unit (Hennebert 1971). And anatomical names do not compete with botanical names.

For example, although Linder (1929) simultaneously proposed *Lasiosphaeria elinorae* sp. nov. and *Helicosporium elinorae* sp. nov. for what he considered one fungus, these are not two names for the same taxon. *L. elinorae*, based on ascogenous material, applies to the species as a whole, including any and all imperfect elements which may occur within its life cycle, whereas *H. elinorae* applies only to the conidiogenous state described. One is a botanical name for a perfect species, the other an anatomical name for an imperfect state. Should *H. elinorae* prove not to be the imperfect state of the fungus which bears the name *L. elinorae*, the latter botanical name would continue to apply to the whole fungus, covering whatever imperfect state might eventually be established as correlated.

Art. 59 exists primarily to control the botanical and anatomical categories of nomenclature for pleomorphic ascogenous and basidiogenous fungi, as follows: 1) to establish the primacy of the names of (botanical, i.e. perfect) genera and species over the names of (anatomical) form-genera and -species; and 2) to rule that a name which is to apply to a perfect species must be based on a type specimen bearing meiosporogenous organs that are referred to in the protologue. The first purpose reduces the nomenclature of anatomical units to a status subordinate to that of truly botanical taxa (so that Axiom I remains undisturbed). And the second points out that whether or not a name is to be treated as botanical in status is determined by the accepted taxonomic position of the type; that is, if the type is classifiable as a perfect fungus, the name applies to a perfect species. Presumably also if a type lacks meiosporogenous organs, if it bears only an imperfect state, the name applies only to a form-species. Thus far, Art. 59 deals fairly with Axiom II, for the type determines application of the name.

Unfortunately, Art. 59 then introduces a qualification of Axiom II. Paragraph 3 of the Article declares that, in dealing with names of a particular kind, if the type is not appropriate, the name may not be applied to any taxon. A binomial bearing the name of a perfect genus is ruled illegitimate unless typification is based on a “diagnosis of the perfect state”. Thus, the Axiom II emphasis on the type is deflected, and conformity between type and original generic name becomes a prerequisite to legitimacy. A name such as *Ravenelia cubensis* Arthur & Johnston is to be judged illegitimate because *Ravenelia* is a perfect genus whereas the type
specimen of the combination is uredinial, an imperfect state.

When Deighton (1960) proposed explicit wording for this ruling – rather reluctantly, we feel – he said: “The name Ravenelia cubensis, though validly published, is regarded as illegitimate because it was published in contravention of the third sentence of Art. 59 and must therefore be rejected”. What is this third sentence to which Deighton refers? In the 1952 Edition of the Code: “The type specimen of a state must bear that state”; and in the 1956 and 1961 editions of the Code: “The type specimen of a name applied to a particular state must show the characteristics of that stage”.

To us, these statements serve to emphasize that application of a name is determined by its type material. If a fungus is described from an imperfect state, its name is correctly applied only to that state, even if the epithet was originally placed in a perfect genus. Correct application is reflected by the name only when the epithet is moved into a genus characterized by the state which is represented by the binomial’s type specimen. This is logical application of the type method.

But the argument behind paragraph 3 of Art. 59 seems to run as follows: “By use of a perfect generic name (Ravenelia), the authors have applied the binomial to a perfect fungus. But the type specimen of the name is an imperfect state of the fungus. Hence the name must be ruled illegitimate”.

This is, to say the least, an unusual approach to type-based nomenclature. Under any other circumstances, if a species name is published validly, the use of wrong generic name, i.e. the application of the name to the wrong group, is no threat to the legitimacy of the name. Consider a case such as the publication of a fungus species in a genus of algae. Hughes (1970) refers to Chroolepus arnottii Hooker in W. H. Harvey’s “Algae Conferoidae”. Do we say that, by using the name of an algal genus (Chroolepus), Hooker applied the binomial to an alga, and since the type is a fungus, the name must be considered illegitimate? No, we do not consign the name to oblivion. C. arnottii Hook. is accepted as legitimately applicable to the fungus. And the logical next step is the transfer to a genus of imperfect fungi as Antennaria arnottii (Hook.) Berk. ex Cooke.

This kind of pathway in accordance with Axiom II, a transfer from Ravenelia to a uredinial genus, is denied to the epithet cubensis. Art. 59 paragraph 3 discards both name and type (except for the purpose of homonymy). It is an obvious attack on Axiom II but Art. 59 does not openly admit that it establishes a case wherein a name is not to be applied according to its type. If an imperfect state is described in a genus of algae, of mosses, even of insects (cf. Art. 49), nothing stands in the way of a validly published name’s being used as basionym for a form-species name. But an imperfect state described in a genus of perfect fungi loses its name as illegitimate on account of Art. 59 paragraph 3.

Now Hawksworth & Sutton (1974) have seized upon this provision in Art. 59 as a proper precedent for striking another blow at Axiom II, viz., “as Art. 59 already treats imperfect states in perfect state genera as validly published but illegitimate, we feel that the converse situation should also apply”.

As will be considered more fully under Case II below, Hawksworth & Sutton would have us discard as illegitimate the name of a perfect species published in a form-genus. Because Penicillium is a form-genus, and the

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name *P. stipitatum* Thom is typified by the ascogenous state of the fungus, they would declare the name illegitimate and inapplicable to any fungus. For Hawksworth & Sutton, Thom’s choice of *Penicillium* as genus is so significant a primary decision that they would discount the legitimacy of applying the name of his species in accordance with the material he described.

Indeed, they go further, as is shown in the discussion of Case III below. The force of the choice of the generic name is to be judged so overpowering that they would take a name such as *P. helicum* Raper & Fennell, first de-holotypify it and then re-typify it. This is a species which was described from material bearing ascii and ascospores, conidiophores and conidia. In order to bring the type into conformity with the generic name, Hawksworth & Sutton would divest *P. helicum* of its perfect holotype and re-typify the binomial by the conidiogenous organs. The species name would become a form-species name, restricted to the imperfect (*Penicillium*) state alone. “This”, they say, “would in most cases be in accord with the intention of the authors publishing such names”.

As a matter of fact, this intention was explicitly denied by Raper & Fennell (1948: 543) when they referred to *P. helicum* and others as “ascocarpic species”. And in any case, it is not what the authors intend but what they do that must be taken into account. When type and protologic description give unequivocal guidance to the application of a name, that name may not be used in any other way. To discard the holotype is to repudiate the type method. Then to proceed to re-typify the previously validly typified species name is further disavowal of allegiance to the Code, for it achieves, in effect, what has been denied to all other followers of that Code – the conservation of specific names with conserved type.

Hawksworth & Sutton’s proposals even challenge the very article within which they operate. Contrary to paragraph 1 of Art. 59, they suggest that it might be possible to treat a nam as “legitimate but referring only to the perfect state portion of the type specimen”. When they decide to rule *P. stipitatum* illegitimate because the “diagnosis was provided only for the perfect state”, they would have us accept that this case is comparable to one wherein a protologue treats only the imperfect state. But to consider the cases parallel disregards the fact that what they call “only the perfect state” is sufficient as sole basis for a name to cover “all states which are states of any one species” (Art. 59 par. 1). Nothing more than meiosporogenous organs are needed in a protologue in order that the name so typified be used as a botanical name, fully subject to all other Articles of the Code.

Finally, it is undesirable enough to set up an artificial illegitimacy for anatomical names, as does Art. 59 paragraph 3. But at least – although otherwise treated like all other names – in their capacity as anatomical names they are the concern only of this Article. To create an additional category of illegitimacy for botanical fungus names, as Hawksworth & Sutton would do, both threatens the status of all other botanical names and further isolates fungus nomenclature from the rest of the Code.

Intent on saving perhaps two dozen binomials in *Aspergillus* and *Penicillium*, Hawksworth & Sutton have taken no note of what has been done traditionally in other groups (see Cases II and III below), where the names of perfect species placed in form-genera have been treated without creating another kind of illegitimacy or denying the botanical significance
of perfect names, without violating Axiom II or trying to conserve specific names.

But it must not be forgotten that the original offense against Axiom II already lies in Art. 59 paragraph 3 – the provision that the choice of a perfect generic name can destroy the legitimacy of a binominal's typification.

In the following section, we will discuss in detail three cases significantly affected either by the offending third paragraph of Art. 59 or by the Hawksworth & Sutton proposals. The logic of applying Axiom II without modification will be demonstrated.

Then, in the final section of this paper, we suggest a simple way to make Art. 59 more self-consistent as well as more compatible with the rest of the Code.

Case studies

Specific cases are cited here illustrating three problems of nomenclature involving the names of perfect species and form-species. Each case is followed by examples, taken mainly from the works of Cummins (1956), Deighton (1960), Hawksworth & Sutton (1974), Laundon (1963, 1967), and Wilson & Henderson (1966). Treatment is presented first according to the present Art. 59, then according to the proposal of Hawksworth & Sutton. Finally, we give our comments.

Case 1: The original description deals with an imperfect state; the type specimen bears the imperfect state; the generic name used is that of a perfect genus.

Examples: Chaetomium raripilum Mont.; Coleosporium mitteri H. Sydow; Hymenochaete tomentosa Berk. & Curt.; Oomyces barbeyi Roum.; Ravenelia cubensis Arth. & Johnston; Sclerotinia alni Maul; Sphaeria ribicola Fr.

The present Art. 59 ruling: Paraphrasing paragraph 3 of the article, it is illegitimate to typify a name in a perfect genus by an imperfect state. Names of this kind are to be judged illegitimate although validly published. And any new combination from these names into form-genera is to be treated as a sp. nov., i.e. Chaetomella raripila Sacc., not "(Mont.) Sacc."; Ureda mitteri Laundon, not "(H. Sydow) Laundon"; Oidium tomentosum Linder, not "(Berk. & Curt.) Linder"; Aecidium barbeyi Roum., not "(Roum.) Roum."; Uredo cubensis Cummins, not "(Arth. & Johnston) Cummins"; Ciboria alni Whetz., not "(Maul) Whetz."; Phyllosticia ribicola Sacc., not "(Fr.) Sacc."

Hawksworth & Sutton proposal: This ruling is accepted by them as proper foundation for the procedures they recommend in Cases II and III (below).

Comment: The premiss on which this ruling is based is that greater nomenclatural force may lie in the appropriate choice of a generic name than in the axiomatic authority of a type specimen. By this ruling, Art. 59 denies that a name is applied in accordance with its type; the species name is prevented from applying to anything because the author misclassified the species or misapplied the generic name.

Had Art. 34 been invoked, as by Groves & Elliott (1960) in their discussion of Sclerotinia alni, there would have been an understandable
reason for discarding some of these names as clearly provisional or inspired 
guesses published in anticipation of a perfect circumscription. But Art. 59 
does not invoke the “not validly published” of Art. 34. Instead, these names 
are accepted as validly published but rejected as illegitimate. 

What is gained by making these names illegitimate is not clear. What is 
lost is an unassailable basis for the Code. Tolerating this crack in Axiom II 
invites the kind of additional damage promoted by Hawksworth & Sutton. 
If one, why not the other? 

If paragraph 3 of Art. 59 did not exist, Axiom II would direct adoption 
of the procedure used by authors such as Cummins (1956), who took the 
validly published epithets wrongly combined with names of perfect genera 
and transferred the epithets into new combinations in form-genera. 

Case II: The original description deals with meiosporogenous organs; 
the type specimen bears these organs; but the generic name chosen is 
that of a form-genus. A later author makes a comb. nov. in a 
perfect genus.

Examples: Apiosporium citri Br. & Pass. to Meliola citri (Br. & Pass.) Sacc.; Asteroma 
silenes Niessl to Asterina silenes (Niessl) Sacc.; Coniothyrium terricola Gilm. & Abbott 
to Thielavia terricola (Gilm. & Abbott) Emmons; Pencillium stipitatum Thom to Talaro-
myces stipitatus (Thom) Benj.; Uredo appendiculata Pers. to Uromyces appendiculatus 
(Pers.) Unger; Uredo bullata Pers. to Puccinia bullata (Pers.) Schrot.; Uredo ficariae 
Schum. to Uromyces ficariae (Schum.) Fuckel; Uredo geranii DC to Uromyces geranii 
(DC) Fries; Uredo muscari Duby to Uromyces muscari (Duby) Graves; Uredo scutellata 
Pers. to Uromyces scutellatus (Pers.) Lév.; Uredo sparsa Schum. & Kunze to Uromyces 
sparsum (Schum. & Kunze) Cooke; Uredo tussilaginis Pers. to Coleosporium tussilaginis 
(Pers.) Berk.; Uredo valerianae DC to Uromyces valerianae (DC) Fuckel. 

The present Art. 59 ruling: This case is not treated in the article. 

Hawksworth & Sutton proposal: It is illegitimate to typify a name in a 
form-genus by meiosporogenous material. The original names are judged 
illegitimate although validly published. The new combinations are treated 
as not validly published as comb.s nov. but, until 1 Jan. 1976, accepted as 
spp. nov. if they fulfil the requirements for valid publication in Arts. 36 
and 37. 

The result (taking the first example for illustration): Apiosporium citri 
Br. & Pass. is illegitimate; Meliola citri Sacc. is the name of the perfect 
species. 

Comment: Art. 59’s unacceptable treatment of Case I has bred the even 
less acceptable Hawksworth & Sutton treatment of Case II. And these 
authors would add another totally unnecessary deadline date to the 
confusion. 

Throughout mycological literature, names such as these have been treated 
consistently as outlined in our set of examples. It is obvious from Deighton’s 
(1960) discussion that he sees no barrier to acceptance of the original names 
here as legitimate but in the wrong (i.e. form-) genera, the comb.s nov. as 
legitimate and correctly placed in perfect genera. The only bar to use of 
the new combination is on the basis of other articles in the Code, as in the 
case of, e.g. Puccinia bullata (Pers.) Schrot., which is a later homonym of 
P. bullata Link. 

With the elimination of paragraph 3 of Art. 59 – as we propose – there 
will be no excuse at all for this proposal of Hawksworth & Sutton’s. And 
the logical treatment used by most authors will continue.
Case III: The original description deals with an imperfect state as well as meiosporogenous organs; the type specimen bears both; the generic name chosen is that of a form-genus.


These were later transferred to perfect genera as follows: Emericella fruculosa (Raper & Fennell) Malloch & Cain; Eupenicillium brefeldianum (Dodge) Stolk & Scott; Talaromyces heliacus (Raper & Fennell) Ben.; Uromyces ambigua (DC) Fuckel; Chrysomyxa ledi var. cassandrae (Peck & Clint.) Savile; Uromyces dianthi (Pers.) Niessl; U. viciae-fabae (Pers.) Schroet.

The present Art. 59 ruling: Case III, like Case II, is not spelt out in this article.

Hawksworth & Sutton proposal: It is illegitimate to typify a name in a form-genus by meiosporogenous material. Therefore the original names are illegitimate as names for perfect species. But because part of the protologue describes the imperfect state and this state is present in type material, the original name in considered a validly published form-species name, re-typified by the imperfect state.

The new combinations are treated as not validly published as cons. nov. but, until 1 Jan. 1976, accepted as spp. nov. if they fulfil the requirements for valid publication in Arts. 36 and 37. The result (taking the first example for illustration): Emericella fruculosa Malloch & Cain is the name of the perfect species, Aspergillus fruculosus Raper & Fennell the name of its conidial state.

Comment: In a Code in which a change in holotypification of a binomial is unthinkable unless the material is composed of “discordant elements” (Art. 70), Hawksworth & Sutton’s covert bid for nom. spec. cons. with typ. nov. cons. is inexcusable.

In an Article which does little more than condone the use of binomials for imperfect states of fungi known to be perfect, to remove a holotypification by the perfect state and impose imperfect-state neotypification is incomprehensible.

And in an Article in which there is already one unnecessary deadline (1 Jan. 1967), to add still another is confusing.

But Hawksworth & Sutton have undertaken this matter because some authors have found it a problem. In a few instances in the literature, treatment of this case has not been simply as shown in our set of examples.

There is P. brefeldianum Dodge (1933), published with a description of the fungus with asci and ascospores, conidiophores and conidia. Stolk & Scott (1967) transferred the species to a perfect genus as Eupenicillium brefeldianum (Dodge) Stolk & Scott, but retained the original combination, P. brefeldianum Dodge, as the name for the “stat. conid.” Implicit in this treatment is the understanding that the species in the fungus as a whole, nomenclaturally acceptable as composed of P. brefeldianum stat. perf. typified by asci and ascospores and P. brefeldianum stat. conid. typified by conidiophores and conidia. The nomenclatural error was not in transferring the epithet to the perfect genus – as Hawksworth & Sutton would have it – but in ascribing to Dodge the publication of P. brefeldianum stat. conid.

The thesis that the species binomial in the form-genus could be regarded as validly published at two levels was openly formulated by Benjamin
when “conidial imperfect helicus. available. anatomical typified legitimate genous already described ciella dotsugae ram unambiguous the Benjamin whole. neously Talaromyces tinet”, unchallengeable to Benjamin, and wrote: “Penicillium helicum Raper & Fennell is a synonym with respect to the ascocarpic form, but the name is valid for the conidial stage”.

This system was followed by many authors, among them Scott (1968), Stolk & Scott (1967), Subramanian (1972), Udagawa (1968), and Udagawa & Kawasaki (1968). But although botanically understandable, it is a system which cannot operate within our Code of Nomenclature, for the following reasons. There is first the matter of holotypification determining application: a name such as P. helicum, with a type classifiable as a perfect fungus, thereby applies unrestrictedly to the species as a whole; it may not be restricted in application to the conidial state alone. Secondly, there is the unchallengeable obligate synonymy between a combination and its basionym: when the name P. helicum serves as basionym for a transfer to the perfect genus as T. helicum, neither binomial has an existence independent of the other. And finally, there is the insuperable difficulty (pointed out by Hawksworth & Sutton) of employing a single combination simultaneously in two different senses, both botanically and anatomically, both for the perfect species and the form-species.

The only approach to the problem that makes no demand for exceptions to basic tenets of the Code is that which treats the species as an indivisible whole. In the above example, Talaromyces helicus (Raper & Fennell) Benjamin covers the species in its entirety. When it is desirable to indicate the imperfect state, we make a concession to practicality by using T. helicum stat. Penicillium (as proposed by Hennebert 1971), which provides unambiguous reference without the need for further formality.

Similar methods of citing imperfect states of species are in frequent use when only a botanical binomial exists. Subramanian (1972), e.g., referred a “conidial state: Aspergillus” to Eurotium herbariorum (Wiggers) Link ex S. F. Gray; Arachniotus purpureum Müller & Pacha-Aue (1968) was described as including a “status conidiophorus Scopulariopsis similis”; Strigopodia batistae was described by Hughes (1968) with a “status phragmoconidialis” which, he said, “ad genus Hormisciellam Bat. pertinet”; as well as a “status phialidicus” which “ad genus Capnophialophoram Hughes pertinet”. In this case, Hughes mentioned that the phragmocondia had been described under the name Helminthosporium pseudotsugae W. B. Cooke, but he did not make formal transfer of the epithet to Hormisciella. This we approve, for Strigopodia batistae stat. Hormisciella is adequately precise and overwhelmingly more informative.

Nonetheless, Art. 59 explicitly condones the use of binomials for imperfect states of perfect fungi. Hence, Stolk & Samson (1972) made a legitimate decision when they referred Arachniotus purpureum stat. Scopulariopsis to “status conidialis: P. purpureum Stolk & Samson stat. nov.”, typified by the conidiogenous structures in type material of the name of the perfect species. For those whose work necessitates reference to anatomical states of a fungus divorced from the whole, this procedure is available. Its application to providing a legitimate binomial for, e.g., Talaromyces helicus stat. Penicillium is clear: valid publication of a new binomial in Penicillium typified by the conidiogenous structures of T. helicus. Obviously, the name may not be P. helicum, for this combination already exists as a legitimate perfect species name, typified by meiosporogenous material.

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Hawksworth & Sutton’s proposed solution to this problem is by means of drastic and destructive change in Art. 59 — to legitimate the way in which Cases II and III above were treated by authors such as Stolk & Samson (1971, 1972) and Udagawa & Takada (1973). It is not an acceptable solution for anyone interested in a self-consistent article governing the nomenclature of particular groups of pleomorphic fungi. Nor is it acceptable to anyone interested in retaining fungus nomenclature within the basic framework of the Botanical Code. Therefore, we earnestly solicit rejection of the Hawksworth & Sutton proposals for changes in Arts. 34, 59 and 72.

CONCLUSION

We recognize fully and admit freely that what we now know about Art. 59 is built on what others have worked and reworked before us (e.g. Bisby 1944, Rogers 1948, Deighton 1960, Donk 1960 a, b, Hennebert 1971, Hawksworth & Sutton 1974). But experience with the 1966-72 version of the article has shown the need for repair. And the threat of Hawksworth & Sutton’s proposal makes that need urgent.

However, because the Nomenclatural Secretariat of the International Mycological Association has established a Committee on Art. 59 which, we trust, will reconstruct the entire article, we propose at this time only what is essential protection against the Hawksworth & Sutton thesis. It is the elimination of paragraph 3 as an indefensible attack on Axiom II.

Proposal no. 36. Re: Art. 59. Delete paragraph 3 in the text, and the first paragraph under Examples.

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